

WHAT IS CLAIMED IS:

1. A low emissions combustion method for a gas turbine engine, comprising:

providing a first plurality of tangential fuel injectors around the closed end of an annular combustor to deliver premixed fuel and air in a first axial plane;

providing a second plurality of tangential fuel injectors around the closed end of an annular combustor to deliver premixed fuel and air in a second axial plane downstream of said first axial plane; and

igniting said first plurality of tangential fuel injectors for an operating mode from idle to low power.

2. The low emissions combustion method of claim 1, and in addition, igniting one of said second plurality of tangential fuel injectors with the hot combustion gases from said ignited first plurality of tangential fuel injectors to meet power requirements greater than idle to low power.

3. The low emissions combustion method of claim 1, and in addition, igniting more than one of said second plurality of tangential fuel injectors with the hot combustion gases from said ignited first plurality of tangential fuel injectors to meet power requirements for intermediate power.

4. The low emissions combustion method of claim 1, and in addition, igniting all of said second plurality of tangential fuel injectors with the hot combustion gases from said ignited first plurality of tangential fuel injectors to meet high power requirements.

5. The low emissions combustion method of claim 1 wherein said first and said second planes are spaced to permit the hot combustion gases

from said first plurality of tangential fuel injectors to substantially fully disperse before reaching said second plane.

6. The low emissions combustion method of claim 1 wherein said first plurality of tangential fuel injectors is two.

7. The low emissions combustion method of claim 1 wherein said second plurality of tangential fuel injectors is three.

8. The low emissions combustion method of claim 1 wherein said second plurality of tangential fuel injectors is four.

9. The low emissions combustion method of claim 1 wherein said first plurality of tangential fuel injectors is two and said second plurality of tangential fuel injectors is four.

10. In a gas turbine engine including a combustor and a plurality of fuel injectors coupled to the combustor, each fuel injector being configured to deliver premixed fuel and air into the combustor, a method of generating low emissions combustion, comprising:

(a) igniting fuel from a first subset of the fuel injectors as a function of a first power requirement; and

(b) igniting fuel from a second subset of the fuel injectors different from said first subset as a function of a second power requirement different from said first power requirement.

11. The method of claim 10, further comprising:

(c) igniting fuel from a third subset of fuel injectors different from said first and second subsets as a function of a third power requirement different from said first and second power requirements.

12. The method of claim 10, wherein step (a) comprises igniting fuel from the first subset of fuel injectors as a function of a first power requirement from idle to low power.

13. The method of claim 12, wherein step (b) comprises igniting fuel from the second subset of fuel injectors as a function of a second power requirement greater than said first, idle to low power requirement.

14. The method of claim 13, further comprising:

(c) igniting fuel from a third subset of the fuel injectors different from said first and second subsets as a function of a third power requirement different from said first and second power requirements.

15. The method of claim 14, wherein said third power requirement corresponds to high power than said second power requirement.

16. The method of claim 13, wherein the second subset of fuel injectors is positioned downstream of the first subset of fuel injectors, and wherein step (b) comprises igniting fuel from the second subset of fuel injectors with hot combustion gases from the ignited first subset of fuel injectors.

17. The method of claim 12, wherein the second subset of fuel injectors is axially spaced apart from the first subset of fuel injectors and positioned downstream of the first subset of fuel injectors, wherein step (b) comprises igniting fuel from at least one of the second subset of fuel injectors with hot combustion gases from the ignited first subset of fuel injectors as a function of a second power requirement greater than said first power requirement.

18. The method of claim 17, wherein step (b) comprises igniting fuel from more than one of the second subset of fuel injectors with hot combustion gases from the ignited first subset of fuel injectors as a function of a second power requirement greater than said first power requirement.

19. The method of claim 18, wherein step (b) comprises igniting fuel from all injectors of the second subset of fuel injectors with hot combustion gases from the ignited first fuel injectors as a function of a third power requirement greater than said second power requirement.

20. The method of claim 17, wherein the first subset of fuel injectors is spaced sufficiently far from the second subset of fuel injectors to permit hot combustion gases from the first subset of fuel injectors to substantially fully disperse before reaching the second subset of fuel injectors.

21. The method of claim 17, wherein the first subset of fuel injectors comprises two fuel injectors.

22. The method of claim 17, wherein the second subset of fuel injectors comprises three fuel injectors.

23. The method of claim 17, wherein the second subset of fuel injectors comprises four fuel injectors.

24. The method of claim 17, wherein the first subset of fuel injectors comprises two fuel injectors and the second subset of fuel injectors comprises four fuel injectors.